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SUBJECT—

TITLE

A PROPOSED PROGRAM OF CONTROL OF THE WESTERN PINE BEETLE IN THE BURNEY AREA THROUGH SALVAGE LOGGING

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A PROPOSED PROGRAM OF CONTROL OF THE WESTERN PINE BEETLE IN THE BURNEY AREA THROUGH SALVAGE LOGGING

Increasing loss of ponderosa pine through attacks of the western pine beetle is now occurring in the Burney area of Shasta County, similar to that occurring in many other areas of northeastern California. This infestation shows a marked increase over last year in most units with all indications pointing to further increased losses next year unless some measures of control are taken.

In addition, there is a very substantial volume of scattered wind-throw loss which has not been salvaged. A cruise of 37 20-acre permanent sample plots completed early in October, in the Burney area showed an average insect loss of 127 board feet per acre for all species for the entire area. This represents only partial insect loss and it is estimated that the total loss caused by insects to all species will be about 167 board feet per acre for the 1951 season. Of this, about 156 board feet is pine. In addition, these plots showed an average wind-throw loss, as the result of a heavy blow late in March 1951, of 195 board feet per acre. Part of this loss has been salvaged where it occurred in heavy concentrations in the Burney Flat and Hat Creek units but it is estimated from the plot records that there is over 100 board feet per acre of wind-throw which has not been salvaged (see Table 1). About one-half of this is pine. If the samples which have been salvaged are deducted from the total, the sample plots then show a net loss of about 328 board feet per acre (see Table 1). Since these data are subject to a sampling error of about 30 percent, this means that the probable true average lies between 228 and 424 board feet per acre. In order to be on the conservative side, the lower limit of 228 board feet per acre has been used in the following estimates of losses by units (see Table 2). About two-thirds of this is pine. Using this figure, this would mean a total loss from insects and wind of about 36 million board feet in the Burney area for the 1951 season. In terms of stumpage values this represents about $720,000 loss unless these values can be recovered.

The most satisfactory solution to this problem would be to cover all the critical areas with sanitation-salvage logging. Since this type of control usually requires a cutting of approximately 15 percent of the merchantable stand volume it is quite obvious that large areas of timber that are hazardous to bark-beetle attack and currently suffering depleting losses cannot be given benefit of sanitation-salvage treatment in a single season due to limited logging and milling capacity of the area. Because we cannot use sanitation-salvage logging to solve this immediate problem it seems advisable to explore every possibility of salvaging part or all of the values represented in the current upward trend of loss and by so doing help to keep the infestation at a low ebb until control practices through use of sanitation-salvage can be concluded in all areas needing treatment.

Table 1. Estimated Volume of Timber Available for Salvage in the Burney Area - Average Board Foot per Acre.

	1951 Loss						
	Insect-killed Trees			Windthrow			All
	Pine	Other	Total	Pine	Other	Total	
Cruised on plots 10/1/51	116	11	127	103	92	195	322
Probable additional insect loss	40	-	40				40
Windfall loss Salvaged Deduct.				-34		-34	-34
TOTAL	156	11	167	69	92	161	328

Table 2. Estimated Volume of Timber Available for Salvage by Units in the Burney Area - 1951 Loss.

Unit	Acres Virgin Timber	Infested No. Trees	Infested Total Volume Board feet	Infested Volume per acre	Total loss incl. abandoned trees plus scattered wind-throw Total Vol. BOARD	Total loss incl. abandoned trees plus scattered wind-throw Vol/acre FEET
Burney Flat	19,223	975	807,000	42	2,400,000	125
Goose Valley	21,250	920	2,018,000	95	6,800,000	320
Dry Lake	16,674	568	1,250,000	75	3,200,000	185
Doyle Butte	12,170	527	791,000	65	1,800,000	148
Thousand Lakes	34,486	1,341	2,414,000	70	6,500,000	189
Hat Creek	11,729	635	762,000	65	2,300,000	196
Big Springs	43,905	2,080	3,951,000	90	13,200,000	300
TOTAL	159,437	7,046	11,994,000	75	36,200,000	228

During the past few years there has been some very substantial advancement in methods of salvaging insect-killed trees in the Burney area. During this period, several small operators with mobile equipment have demonstrated that it is both practical and profitable to salvage scattered insect-killed trees. William Hannan, of Old Station, was the pioneer in this field through the development of a self-loading, 4-wheel drive, logging truck. He demonstrated that it was possible to log scattered infested trees and snags in relatively level terrain without using a tractor or a separate loading rig. His method was to fall, limb, and buck each tree into 16-foot logs and then drive up alongside each log and roll it on to the truck by means of a special cross-haul arrangement built into the truck (see Figure 1). Recently, other operators have adopted his idea and are using the same principle of operation in salvaging timber in the Burney area. At the present time, these operators are capable of salvaging about 5 million feet of infested and wind-thrown timber annually providing such material is made available to them. The purpose of this paper is to suggest a program whereby the present heavy losses in the Burney area can be at least partly salvaged and scheduled in such a way as to obtain maximum control benefits through this operation. At its meeting in Sacramento on October 29, the Forest Pest Control Action Committee heartily endorsed the program of salvage of insect-killed trees for the control of the western pine beetle.

Much of the Burney area is well adapted, topographically, to the use of portable logging equipment. In addition to this, there are a number of salvage operators in the area who are willing and eager to carry out such a program.

Under present market conditions, this project should more than pay its way. It is estimated that the insect-killed stumpage in this area could be sold for at least $8.00 per thousand. Spotting costs, using a three-man conventional crew, would be about $.65 per thousand, and if it proved feasible to sell this material on a tree measurement basis, this would leave a balance of $7.35 to cover overhead and administration, which should result in a very substantial margin of profit. From this it is estimated that every dollar expended for spotting would return $10 (see Table 3). It, therefore, would appear to be good business as well as good forestry to attempt to accelerate this program of salvage to the maximum which the local operators can handle.

Recommendations

1. Entomological Considerations

In order for this operation to yield maximum control benefits it should be designed to completely cover large entomological units. This would mean 100 percent spotting of all areas included in the project. The insect-killed trees containing brood should be designated on the spotting map so that they could be segregated from those from which the brood had emerged. It is recommended that the currently infested trees be removed first and that this then be followed by the removal of all

A

B

Figure 1. Portable log salvage outfit developed by William Hannan, Old Station, Calif. A. Butt log being loaded. Cup stump in middle foreground. B. Winch at front end of truck is operated by truck driver from cab. Line passes over a frame to a block secured at right angles to pull and log rolls on at the will of the operator. Logs length - 16 feet. Logs up to 72" in diameter have been loaded on this rig in this manner.

Table 3. Estimated Merchantable Salvage Volume, Stumpage Value and Spotting Cost for the Burney Area by Units.

Unit	Estimated Value Board Feet	Estimated Value at which stumpage could be sold	Estimated spotting cost
Burney Flat	2,400,000	$ 19,200	$ 2,880
Goose Valley	6,800,000	54,400	3,200
Dry Lake	3,200,000	25,600	2,500
Doyle Butte	1,800,000	14,400	1,800
Thousand Lakes	6,500,000	52,000	5,200
Hat Creek	2,300,000	18,400	1,800
Big Springs	13,200,000	105,600	6,600
TOTAL	36,200,000	$289,600	$23,980

remaining merchantable salvage material, so as to obtain maximum control benefits as well as maximum utilization of insect-killed and wind-thrown trees. This would mean dual coverage of the area by the salvage operator, but with mobile equipment this should not pose a serious problem.

It is not considered necessary to treat the unmerchantable infested portions of the tree for the control of the western pine beetle where salvage is undertaken because this operation will remove about 90 percent of the population from the woods.

If the above conditions are met we would expect substantial control benefits comparable to cut-peel-burn methods.

2. Size of Area to be Treated

The size of the area selected for this salvage operation would depend on the amount of salvage material which the local salvage operators could efficiently handle. This would be one of the first things to be established. At the same time, it would be well to establish a value for insect-killed stumpage which would be acceptable to all parties concerned. When these facts have been determined the boundaries of the control zone could be established which would include enough territory to yield the expected capacity of the operators. The areas shown in red on the attached map are considered suitable for the use of portable salvage logging equipment. It is expected that the Goose Valley, Doyle Butte, and Big Springs Units would yield sufficient salvage to satisfy the requirements of all interested salvage operators. The priority of treatment is in the order of listing above.

3. Spotting

After the size of the area is determined and the control boundaries are set, the next logical step would be to completely spot all areas to be covered with salvage control. By using a conventional 3-man spotting crew this work could be done at an estimated cost of about $.15 per acre or about $100 per section.

There is a possibility that aerial photographs at about 1/10,000 foot scale would be of help in this job. These photographs might be obtained from some commercial company through contract with specifications that the job be completed at some predetermined time. After the photographs are received they could then be examined by a competent photo interpreter who would count the number of infested trees and mark these on the photos. This then would give a rough idea as to the number of infested trees and wind-throws in the area and as to where the heavy losses were concentrated. The individual spotters could then take the map into the field and locate each tree on the ground and at the same time mark and measure the diameter. At the same time, he could check for the occurrence of green infested trees around all groups and mark in any additional loss which did not show up in the photograph. If this system proved practical it would eliminate the use of a compassman and by using the aerial photograph as a spotting map it would show the exact location of each infested, abandoned merchantable, and wind-thrown tree as well as all physical features and should be a great aid to the fallers and loggers in locating all trees. The cost of the photos is estimated at about $.02 per acre.

4. Cooperation of Landowners

In order for such a program to be fully successful it should have the full cooperation of all landowners within the zone of salvage control. The principal owners of virgin timber in the proposed area are the Fruit Growers Supply Company and the U. S. Forest Service (see Table 4). At the present time there is a very fine degree of on-the-ground cooperation between these two agencies in the salvage program on an informal basis, and there is no reason to expect that this should not continue on a more formalized basis.

5. Quality of Timber Salvaged

Practically no information is available as to the quality of lumber produced from insect-killed trees under current market conditions and it is suggested that consideration be given to a mill study as part of this project. Such a study might be arranged in cooperation with the School of Forestry or with the California Forest and Range Experiment Station.

6. Timing of the Salvage Operation

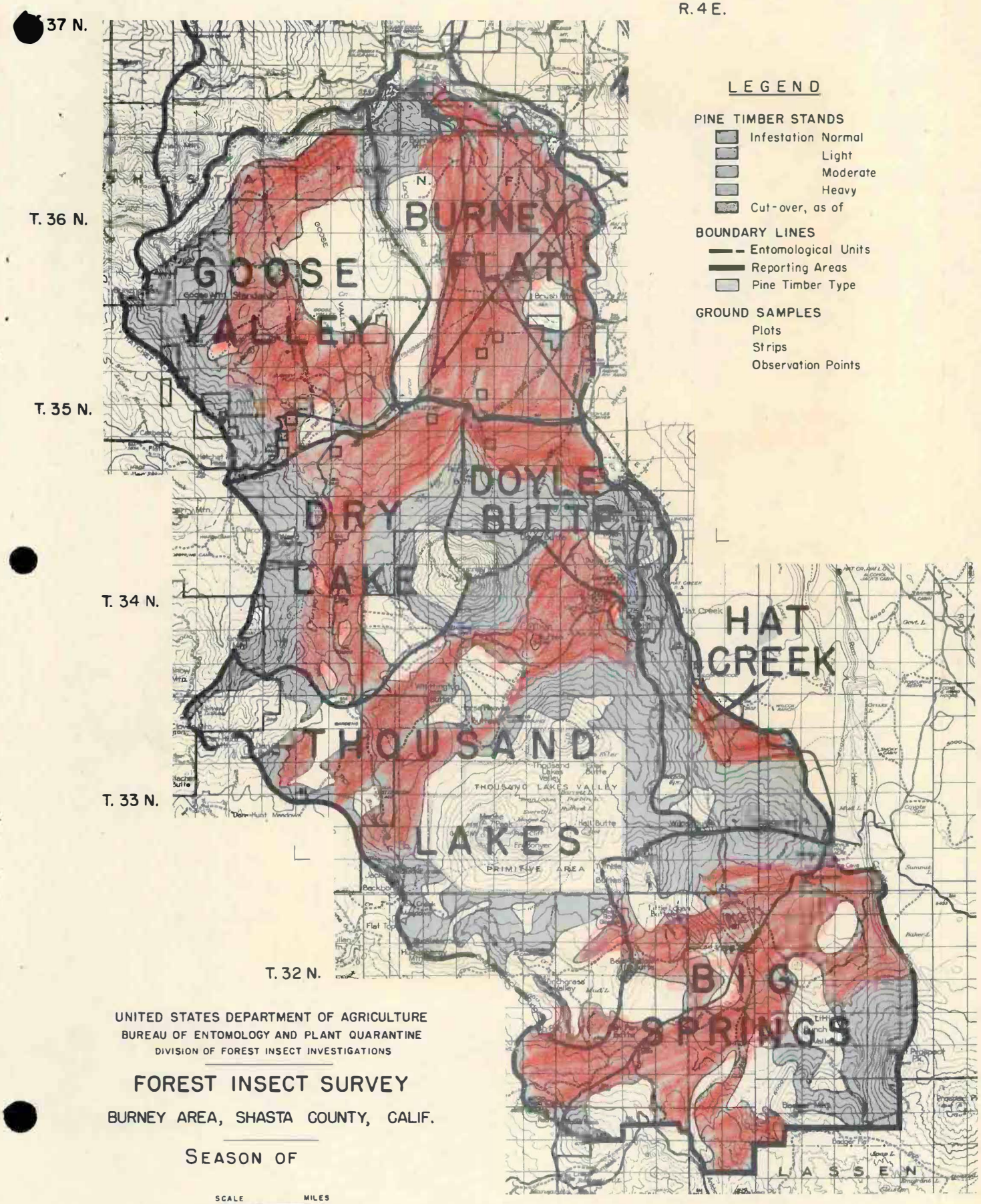
In order to obtain maximum control efficiency from this operation, provision should be made to get the currently infested trees out of the woods by about May 1, 1952. The balance of the merchantable salvage material could be removed at the convenience of the salvage operators.

CONCLUSION

Recent advances in salvage methods in the Burney area indicate that this is a tool which could be used more widely in the control of the western pine beetle in areas which are reasonably level. It promises to be a substitute for sanitation-salvage logging on a limited basis. Under present market conditions, it is expected that this method of control will more than pay its way. It is granted that this method will yield control benefits which are of a temporary nature and must be applied annually, but in so doing, it may be possible to hold the line in critical areas until such a time as sanitation-salvage can be applied for more permanent relief.

Table 4. Burney Area. Ownership of virgin timber by units.

Unit	Virgin Timber Acres	Percentage by Ownership		
		U. S.	Fruit Growers Supply	Other Private
Burney Flat	19,223	28.8	71.2	0
Goose Valley	21,250	22.7	55.2	22.1
Dry Lake	16,674	12.8	69.7	17.5
Doyle Butte	12,170	13.1	80.2	6.7
Thousand Lakes	34,486	55.9	37.0	7.1
Hat Creek	11,729	34.4	59.5	6.1
Big Springs	43,905	80.0	20.0	0
TOTAL	159,437	41.0	48.0	11.0



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DIVISION OF FOREST INSECT INVESTIGATIONS

FOREST INSECT SURVEY

BURNEY AREA, SHASTA COUNTY, CALIF.

SEASON OF